OMA, IPSO & IETF CoRE

Jaime Jiménez
jaime.jimenez@ericsson.com

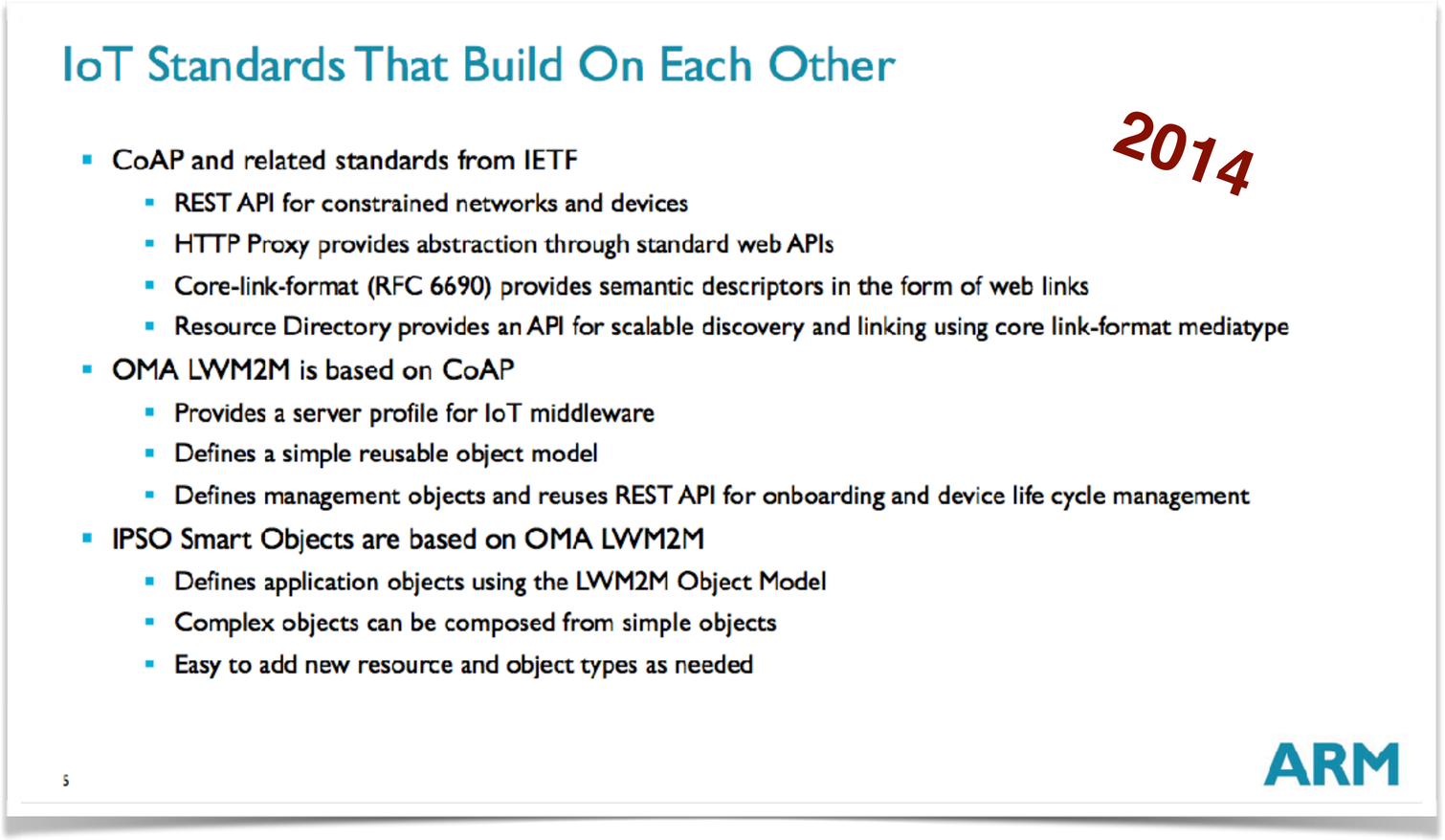
IETF CoRE WG Co-Chair
IPSO Smart Objects chair

@jaim - jaimejim.github.io

OMA F2F - Warsaw

ERICSSON

Standards built on each other



IPSO Smart Objects

- Based on the LWM2M Object Model but for Application Data.
- Domain-specific objects created by vendors themselves.
- Provides a consistent Design Pattern and Reusable Resource Definitions.
- Non-mandatory resources can be modified, new Objects can easily be added and automatically validated.
- Released Objects are registered in OMNA and use the standard OMA DDF (XML) object descriptors.
- 53 Objects (temperature, … stopwatch), registered with OMNA and 100 Reusable Resources.
- Openly available and easy to contribute: http://ipso-alliance.github.io/pub

IPSO Smart Objects

- Object representation as in LWM2M

```
<object ID>/<object instance ID>/<resource ID>
```

- URI

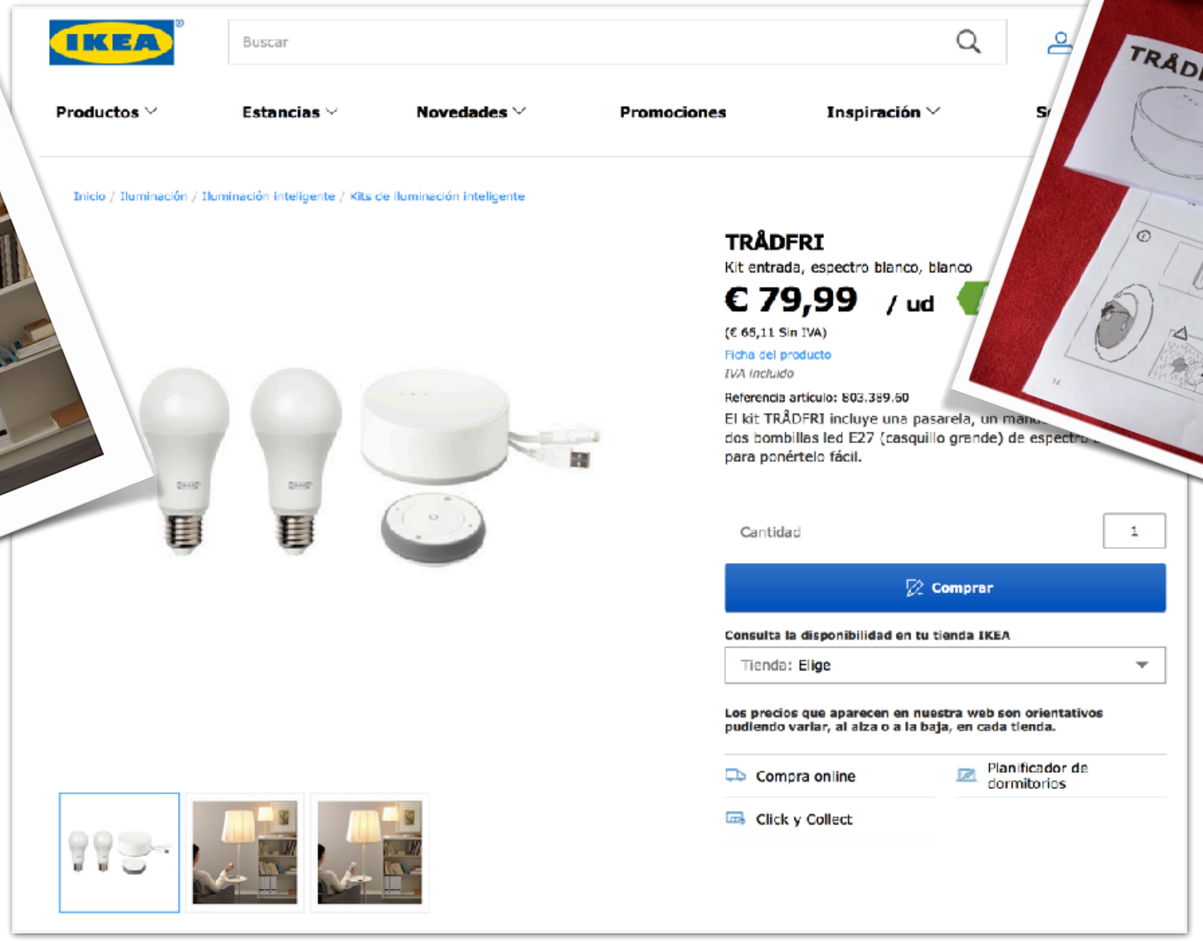
```
coap://device1.example.com/3303/0/5700

3300  -> Temperature Sensor
0     -> instance 0 of a Temperature Sensor
5700  -> resource having the current value or a most recent reading
```

- Implemented in Wakaama, Leshan, Contiki, LWMQN, BIPSO and products that use LWM2M.

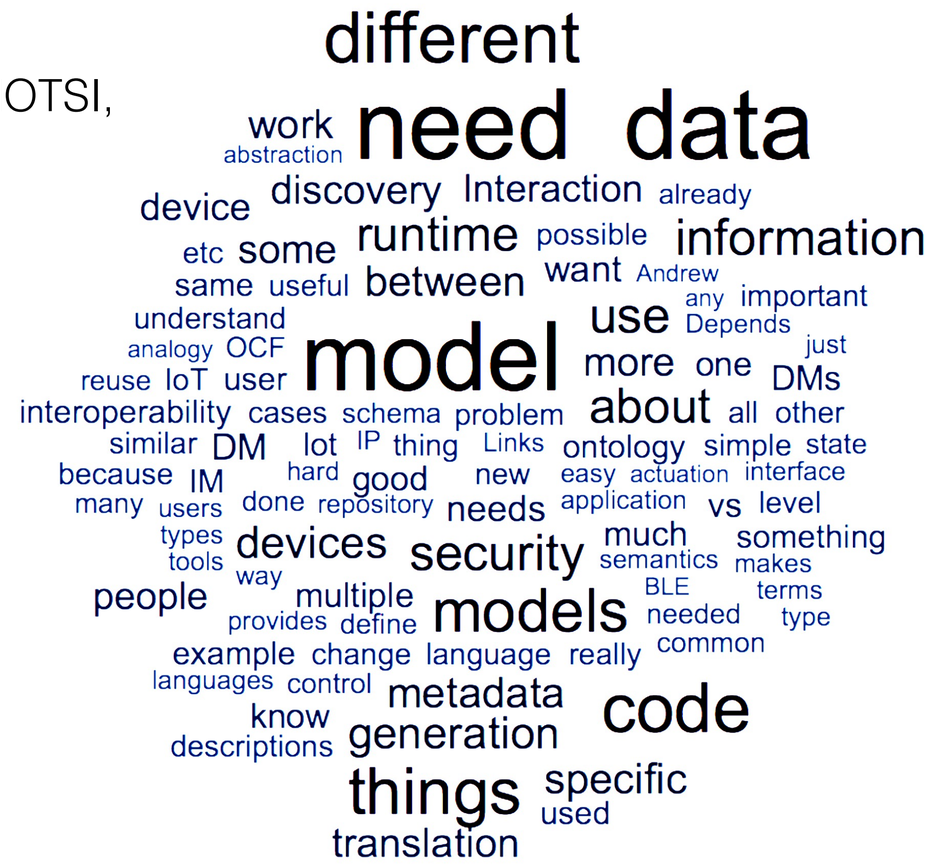
- Available in multiple IoT OS: Contiki, RIOT, Mbed, Zephyr…

IKEA TRÅDFRI



Possible Future Work

- Alignment with other SDOs (OCF, WoT, Schema.org…).
- Alignment with the community through IAB Workshops (IOTSI, WISHI)
- Web links + RFC6690 + Link JSON/CBOR
  - Weblinks
  - Link Relations and Anchors.
  - Link Attributes (LWM2M has some already)
  - Compact Serialisation
- Support for `/.well-known/core`
- Support for Web Forms.
  - https://tools.ietf.org/html/draft-hartke-t2trg-coral-00
  - https://tools.ietf.org/html/draft-koster-t2trg-hsml-01



IOTSI Workshop most common words.

IETF and IoT Work

- IETF's role: Specify the underlying, fundamental Internet Technologies.
- "Permissionless innovation" - so that others can build on top.

Run <IoT transfer protocol> over IP	Security for IoT (ACE, COSE)
Routing for lossy & low power networks	Thing-to-Thing communication (T2TRG)
TLS	Architectural oversight (IAB)
Web technology for IoT (CoRE)	CBOR (Constrained Binary Object)

IETF CoRE WG

- 12 documents that are WG items.
- Base of current LWM2M.
- Addressing CoAP protocol, security, linking, discovery, congestion control, data serialisation, modelling in YANG, HTTP Proxying, Publish-Subscribe…
- Some of them recently updated like Resource Directory or CoAP over TCP.
- More drafts on the pipeline …

Working Group Documents: *Document collections: epub*

Draft name	Rev.	Dated	Status	Comments, Issues
Active:				
draft-ietf-core-coap-pubsub	-02	2017-07-03	Active	
draft-ietf-core-cocoa	-02	new 2017-10-30	Active	
draft-ietf-core-comi	-01	2017-07-18	Active	
draft-ietf-core-dynlink	-04	2017-09-14	Active	
draft-ietf-core-echo-request-tag	-00	new 2017-10-30	Active	
draft-ietf-core-interfaces	-10	2017-09-14	Active	
draft-ietf-core-object-security	-06	2017-10-25	Active	
draft-ietf-core-rd-dns-sd	-00	2017-07-03	Active	
draft-ietf-core-resource-directory	-12	new 2017-10-30	Active	
draft-ietf-core-senml	-11	new 2017-10-30	Active	
draft-ietf-core-sid	-02	new 2017-10-30	Active	
draft-ietf-core-yang-cbor	-05	2017-08-08	Active	
IESG Processing:				
draft-ietf-core-coap-tcp-tls	-10	new 2017-10-30	IESG Evaluation::AD Followup	
draft-ietf-core-links-json	-09	2017-07-03	IESG Evaluation::AD Followup	
Published:				
Draft name	**Rev.**	**Dated**	**Status**	**Obsoleted by/(Upda**
draft-ietf-core-block	-21	2016-07-08	RFC 7959	
draft-ietf-core-coap	-18	2013-06-28	RFC 7252	*(RFC 7959)*
draft-ietf-core-ctch	-04	2016-11-14	RFC 8132	
draft-ietf-core-groupcomm	-25	2014-09-12	RFC 7390	
draft-ietf-core-http-mapping	-17	2016-11-28	RFC 8075	
draft-ietf-core-link-format	-14	2012-06-01	RFC 6690	
draft-ietf-core-observe	-16	2014-12-30	RFC 7641	

The document name you specified, "*draft-*-core-*", matched multiple documents:
(There were 226 matches, and the list has been truncated. But if you want, you can see them all.)

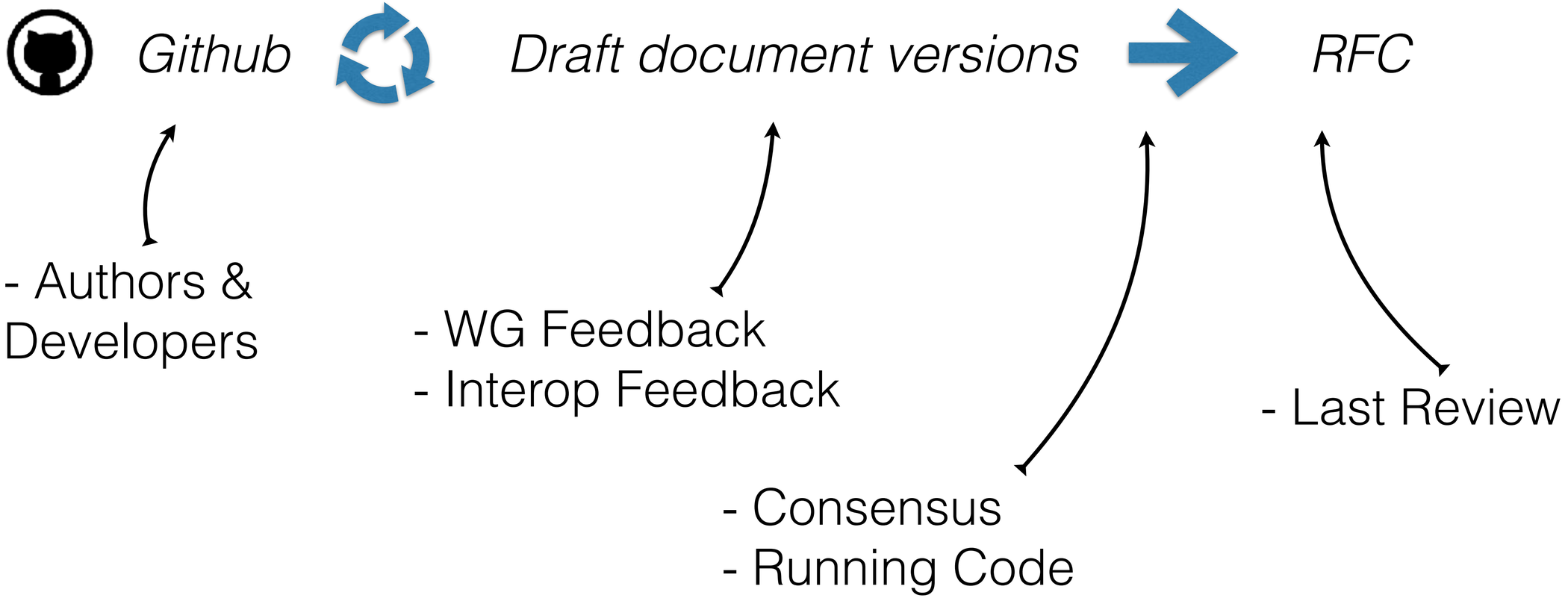
sort by date sort by name

30 Oct 2017	draft-ietf-core-coap-tcp-tls	txt pdf
30 Oct 2017	draft-ietf-core-resource-directory	txt pdf xml html
30 Oct 2017	draft-arkko-core-dev-urn	txt pdf
30 Oct 2017	draft-ietf-core-sid	txt pdf xml html
30 Oct 2017	draft-mattsson-core-coap-actuators	txt pdf xml html
30 Oct 2017	draft-silverajan-core-coap-protocol-negotiation	txt pdf
30 Oct 2017	draft-liu-core-coap-delay-attacks	txt pdf
30 Oct 2017	draft-ietf-core-echo-request-tag	txt pdf xml html
30 Oct 2017	draft-ietf-jmap-core	txt pdf xml html
27 Oct 2017	draft-tiloca-core-multicast-oscoap	txt pdf
27 Oct 2017	draft-toutain-core-time-scale	txt pdf xml html
25 Oct 2017	draft-ietf-core-object-security	txt pdf xml html
30 Sep 2017	draft-mattsson-core-security-overhead	txt pdf xml html
22 Sep 2017	draft-dulaunoy-misp-core-format	txt pdf xml html
14 Sep 2017	draft-ietf-core-dynlink	txt pdf
14 Sep 2017	draft-ietf-core-interfaces	txt pdf
07 Sep 2017	draft-wang-core-opcua-transmission	txt pdf
22 Aug 2017	draft-hartke-core-pending	txt pdf
08 Aug 2017	draft-ietf-core-yang-cbor	txt pdf xml html
29 Jul 2017	draft-hartke-core-e2e-security-reqs	txt pdf
24 Jul 2017	draft-veillette-core-yang-library	txt pdf xml html
18 Jul 2017	draft-bormann-core-ace-aif	txt pdf
18 Jul 2017	draft-ietf-core-comi	txt pdf xml html
03 Jul 2017	draft-ietf-core-coap-pubsub	txt pdf
03 Jul 2017	draft-ietf-core-rd-dns-sd	txt pdf xml html
03 Jul 2017	draft-ietf-core-links-json	txt pdf
03 Jul 2017	draft-ietf-core-senml	txt pdf
03 Jul 2017	draft-silverajan-core-coap-alternative-transports	txt pdf
01 Jul 2017	draft-amsuess-core-repeat-request-tag	txt pdf xml html
23 Jun 2017	draft-urien-core-identity-module-coap	txt pdf
21 Jun 2017	draft-wang-core-opcua-transmition-requirements	txt pdf
09 Jun 2017	draft-urien-core-racs	txt pdf
19 Apr 2017	draft-groves-core-rfc6690up	txt pdf xml
19 Apr 2017	draft-groves-core-senml-bto	txt pdf xml html
27 Mar 2017	draft-amsuess-core-request-tag	txt pdf xml html
13 Mar 2017	draft-groves-core-bas	txt pdf xml html
13 Mar 2017	draft-ietf-core-cocoa	txt pdf
13 Mar 2017	draft-scantck-abnf-more-core-rules	txt pdf
10 Mar 2017	draft-groves-core-senml-options	txt pdf xml html
21 Feb 2017	draft-groves-core-obsattr	txt pdf xml html
20 Feb 2017	draft-becker-core-coap-sms-gprs	txt pdf
12 Feb 2017	draft-hartke-core-apps	txt pdf
18 Jan 2017	draft-vanderstok-core-comi	txt pdf xml html
06 Dec 2016	draft-garcia-core-app-layer-sec-with-dtls-record	txt pdf xml html
28 Nov 2016	draft-ietf-core-http-mapping	txt pdf xml html
14 Nov 2016	draft-ietf-core-ctch	txt pdf xml html
31 Oct 2016	draft-thaler-core-redirect	txt pdf
29 Oct 2016	draft-vanderstok-core-coap-est	txt pdf xml html
27 Oct 2016	draft-vanderstok-core-yang-lwm2m	txt pdf xml html
27 Oct 2016	draft-cao-core-delegated-observe	txt pdf
23 Aug 2016	draft-veillette-core-cool-library	txt pdf xml html
18 Aug 2016	draft-vanderstok-core-cbor-yid	txt pdf xml html
16 Aug 2016	draft-bierman-core-yid	txt pdf xml html
18 Jul 2016	draft-veillette-core-cool	txt pdf xml html
08 Jul 2016	draft-somaraju-core-sid	txt pdf xml html
08 Jul 2016	draft-ietf-core-block	txt pdf xml html
08 Jul 2016	draft-bormann-core-groupcomm-cbor	txt pdf
08 Jul 2016	draft-bormann-core-cocoa	txt pdf
08 Jul 2016	draft-koster-core-coap-pubsub	txt pdf xml html
06 Jul 2016	draft-groves-core-dynlink	txt pdf xml html
04 Jul 2016	draft-zheng-core-coap-lantency-evaluation	txt pdf
28 Jun 2016	draft-bormann-core-coap-sig	txt pdf
16 Jun 2016	draft-savolainen-core-coap-websockets	txt pdf
10 Jun 2016	draft-bormann-core-block-bert	txt pdf
10 Jun 2016	draft-gomez-core-tcp-constrained-node-networks	txt pdf xml html
15 Apr 2016	draft-vasu-ace-core-access-privilege-provisioning	txt pdf
05 Apr 2016	draft-jennings-core-senml	txt pdf
21 Mar 2016	draft-fang-core-coap-pubsub-failure-detection	txt pdf
21 Mar 2016	draft-vanderstok-core-etch	txt pdf
18 Mar 2016	draft-rahman-core-advanced-rd-features	txt pdf xml html
15 Mar 2016	draft-vanderstok-core-patch	txt pdf xml html
11 Mar 2016	draft-veillette-core-yang-cbor-mapping	txt pdf xml html
11 Mar 2016	draft-turner-core-cool-problem-statement	txt pdf xml html
07 Mar 2016	draft-vanderstok-core-mpl-yang	txt pdf xml html
29 Feb 2016	draft-fossati-core-server-name-id	txt pdf xml html
17 Feb 2016	draft-pelov-core-cosol	txt pdf xml html
10 Feb 2016	draft-bierman-core-yang-hash	txt pdf xml html
03 Nov 2015	draft-tschofenig-core-coap-tcp-tls	txt pdf
19 Oct 2015	draft-bormann-core-coap-fetch	txt pdf
19 Oct 2015	draft-vasu-core-ace-service-provisioning	txt pdf
30 Sep 2015	draft-zotti-core-sleepy-nodes	txt pdf xml html
14 Sep 2015	draft-hartke-core-lighting	txt pdf
06 Jul 2015	draft-fossati-core-certmode-rd-names	txt pdf xml html
02 Jul 2015	draft-castellani-core-advanced-http-mapping	txt pdf xml html
29 Jun 2015	draft-seitz-ace-core-authz	txt pdf
17 Jun 2015	draft-carey-core-std-msg-vs-trans-adapt	txt pdf xml html
08 Jun 2015	draft-ietf-scim-core-schema	txt pdf xml html
09 Mar 2015	draft-bormann-core-cc-qq	txt pdf
09 Mar 2015	draft-li-core-cbor-equivalents	txt pdf xml html

Possible LWM2M Additions

- *[RFC8132]* Support of PATCH/FETCH methods, it'd be greatly beneficial for firmware upgrade or observing relatively large sets of resources.
- *[RFC7641]* Support of observe between LWM2M Clients in order to subscribe to updates from one another.
- *[RFC8075]* In cases of GWs that need to implement a HTTP to CoAP proxy.
- *[RFC7049]* CBOR formatting instead of TLV.
- *[I-D.ietf-core-coap-tcp-tls]* **(updated)** outlines the changes required to use CoAP over TCP, TLS, and WebSockets transports.
- *[I-D.ietf-core-resource-directory]* **(updated)** Other than traditional LWM2M, CoAP's in-built discovery would be beneficial to support device-to-device cases. New version just published, https://tools.ietf.org/html/draft-ietf-core-resource-directory-12
- *[I-D.ietf-core-object-security]* **(updated)** For systems in which endpoints work behind a gateway or use LWM2M for managing the gateways, it might be good to implement other types of cryptographic protection than TLS/DTLS.

Ways of Working



Assorted References

REST	https://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm
CoAP	https://tools.ietf.org/html/rfc7252
CoRE Link-Format	https://tools.ietf.org/html/rfc6690
CoAP Observe	https://tools.ietf.org/html/rfc7641
CBOR	https://tools.ietf.org/html/rfc7049
IOTSI	https://www.iab.org/activities/workshops/iotsi/
IOTSU	https://www.iab.org/activities/workshops/iotsu/
CoRE RD	https://datatracker.ietf.org/doc/draft-ietf-core-resource-directory/
LWM2M	https://github.com/OpenMobileAlliance/
CoMI	https://tools.ietf.org/wg/core/draft-ietf-core-yang-cbor/
WISHI	https://wishi.space
CoAP TCP+TLS	https://tools.ietf.org/wg/core/draft-ietf-core-coap-tcp-tls/
IPSO	http://ipso-alliance.github.io/pub/
LWM2M to YANG	https://tools.ietf.org/html/draft-vanderstok-core-yang-lwm2m-00
OSCOAP	https://tools.ietf.org/wg/core/draft-ietf-core-object-security/
CoAP for LWM2M	https://tools.ietf.org/html/draft-jimenez-t2trg-coap-functionality-lwm2m